January, 1958

THE CHEMIST

VOLUME XXXV NUMBER 1

Dr. Arnold O. Beckman

Receives Honorary AIC Membership

(See Page 9)

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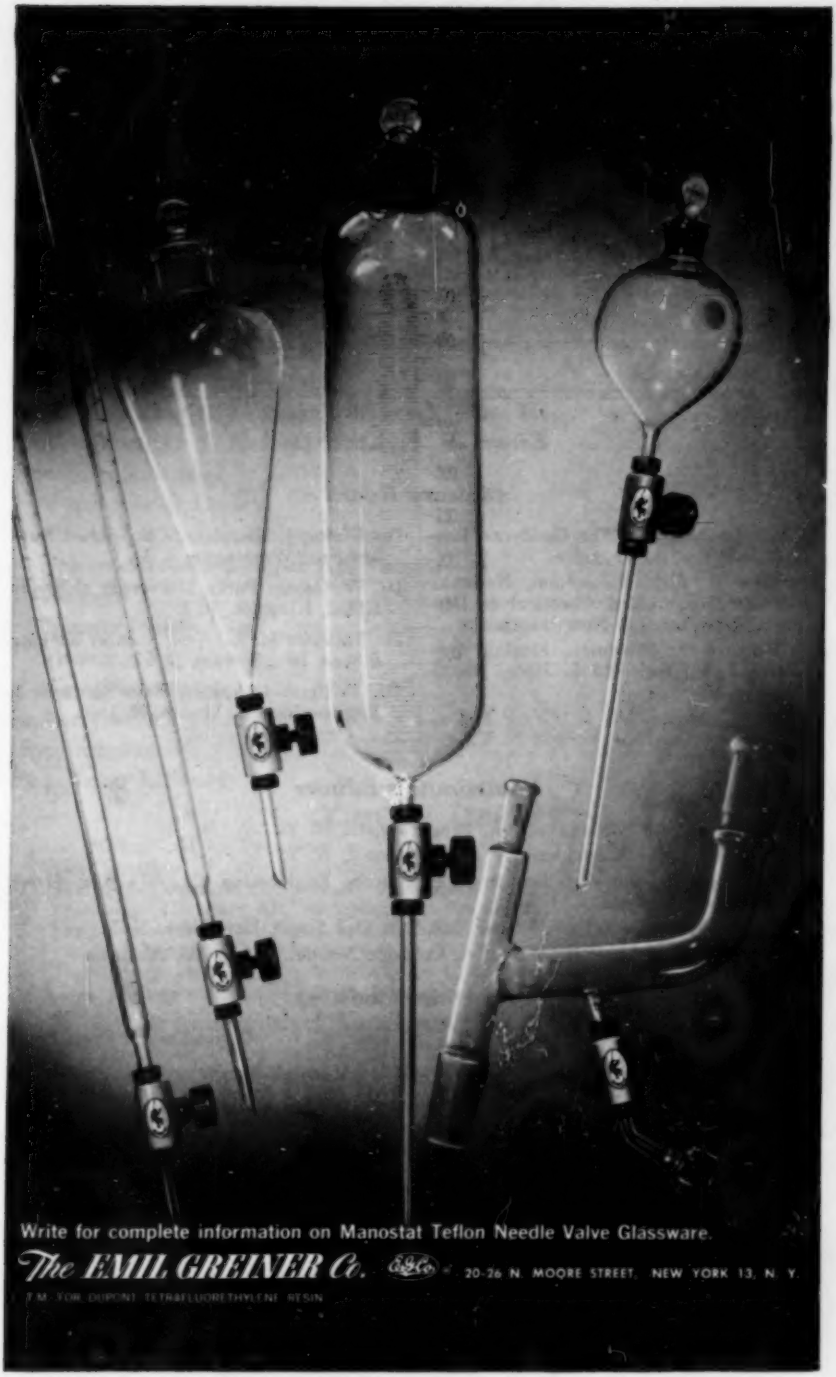
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Publication of

THE AMERICAN INSTITUTE OF CHEMISTS, INC.

60 East 42nd street, New York 17, N. Y.

Entered as second class matter April 8, 1936 at the Post Office at New York, N. Y., under Act of August 24, 1912. Issued monthly.

Subscription price, $2.00 a year to Members, $3.00 to Non-Members. Single copy, this issue, $0.25. Copyright, 1958 by THE AMERICAN INSTITUTE OF CHEMISTS, INC.

Vol. XXXV January, 1958 Number 1

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Deadlines for *The Chemist*

Copy for the March issue of The Chemist should be in our hands before February 10th. Advertising copy for March should be received not later than February 15th.

THE AMERICAN INSTITUTE OF CHEMISTS does not necessarily endorse any of the facts or opinions advanced in articles which appear in THE CHEMIST.

IN THIS ISSUE

TO COME IN FEBRUARY

"The Need for Prescience in Organic Chemistry," by Dr. W. E. Hanford, vice president of Olin Industries, Inc., is an extraordinary chart of "New Worlds to Conquer," here and now. He gave it before an enrapt audience when he received Honorary AIC Membership in December. From the West Coast, we have now received Dr. Harry L. Fisher's revelations about Dr. A. O. Beckman (and we hope to have a message from Dr. Beckman), whose Honorary AIC Membership presentation was announced in January. Dr. M. J. Kelley continues his fine series on "Understanding the Creative Process."

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EDITORIAL

Our Thirty-fifth Anniversary

Dr. Lloyd Van Doren
AIC Secretary

THIS New Year of 1958 commemorates the thirty-fifth anniversary of THE AMERICAN INSTITUTE OF CHEMISTS. In 1923, a group of chemists and chemical engineers met in New York and New Jersey to create a new organization dedicated solely to the professional needs of these scientific people.

Their first objective was to prepare a code of principles of professional conduct to justify confidence in the integrity of the chemist and chemical engineer. Ever since then, all who become members of the AIC must agree to adhere to this Code of Ethics, which is enforced by the Committee on Ethics through the National AIC Council. The other objectives are stated in the AIC Constitution and were printed most recently in the February 1957 issue of THE CHEMIST.

During this anniversary year, we plan several commemorative activities:

The Thirty-Fifth Annual Meeting will be held for the first time in the Far West, April 10-11, 1958, at the Ambassador Hotel, Los Angeles, Calif., with the Western Chapter acting as host. Its theme will be "The Chemist and the Public." We urge every member who can do so to attend, and to enjoy the traditional hospitality of the West, while making new friends and celebrating our 35th Anniversary.

The Committee on AIC History plans to publish the story of the INSTITUTE, and its many activities during the years.

It has been suggested that the AIC Code of Ethics be printed in a form suitable for framing, for members to exhibit in their offices or laboratories. If you would like to have the Code in this form, please send the AIC Secretary a postal card. If sufficient requests are received to indicate interest, we will investigate the printing possibilities.

The Chicago AIC Chapter is currently sending out cards to its membership asking everyone to suggest the names of potential members among his friends. This idea, "Every member get a new member", could double our membership during this Anniversary Year. So, whether you belong to the Chicago Chapter or some other, please send in the name of at least one of your qualified friends to the AIC Secretary, and let us celebrate our thirty-fifth year by doubling our membership!

A new directory of membership will be published in the April issue of THE CHEMIST. Members elected at the February meeting of the Na-

tional Council will be included in this directory. Applications for membership should be sent to the AIC Secretary, to arrive not later than January 31st, for presentation at the February Council Meeting.

Among our present membership are some Charter Members, those who joined in 1923. We would like to have their comments, reminiscences, or suggestions, and we hope they will write to us. We also invite comments from all AIC members.

We urge every AIC member to cooperate enthusiastically to make this an especially memorable year of accomplishment!

Special AIC Announcements

Dr. Timm to be Honored

The New England Chapter will award its Honor Scroll to Dr. John A. Timm, director, School of Science, Simmons College, at a dinner meeting to be held at the House of the American Academy of Arts and Sciences, Brookline, Mass., January 14, 1958. Dr. William A. Park, president of Simmons, will introduce Dr. Timm, who will speak on "Sputnik and Science Education."

The Chemist and the Public

The theme of the 1958 Annual Meeting of the AIC, will be, "The Chemist and the Public," a timely subject to coincide with the new interest that the public is now taking in scientists. Drs. Emil Ott and Frederick G. Sawyer, co-chairmen of the Program Committee, are planning lively professional sessions with outstanding speakers. Los Angeles, California, is the place; April 10-11, 1958.

AIC Reprints Available

"The Employed Chemist and His Employer." Report of Committee on Employer-Employee Relationships. Dr. E. H. Northey, chairman. (20 cents each.)

"An Educator Observes the Chemist," By Dr. Roger Adams. (15 cents each.)

"A Proposed Contract for Chemists and Chemical Engineers." Prepared by the Sub-committee on Employer-Employee Relations. Chairman of subcommittee, Dr. Lloyd A. Hall. (15 cents each. Mimeographed.)

Sizing up Members for the Team." By Dr. George L. Royer. On techniques of interviewing applicants for positions. (15 cents each.)

"Opportunities in Chemistry." By Dr. Maurice J. Kelley. Covers industrial positions. (Mimeographed. 20 cents each.)

"Use Technical Manpower More Efficiently." By Dr. Ed. F. Degering. Suggestions. (20 cents each.)

"Termination of Employment." Report of Committee on Employer-Employee Relations concerning adequate notice of termination of employment. Dr. E. H. Northey, chairman. (10 cents each.)

"These Are Our Objectives." Statement of objectives of The American Institute of Chemists. (No charge.)

These reprints may be ordered from the Secretary, The American Institute of Chemists, 60 E. 42nd Street, New York 17, N.Y.

Will You Come

Jan. 7, 1958. New Jersey Chapter. Meeting. Dinner 6:30 p.m. Military Park Hotel, Newark, N. J. Symposium: "Management—Technical Employee Relationships." Management's views will be presented by: Dr. William H. Lycan (Johnson & Johnson); Dr. Stanley O. Morgan (Bell Telephone Labs.), and Dr. Max Tishler (Merck & Co., Inc.) Presenting the viewpoint of Technical Personnel: Paul O. Blackmore (Interchemical Corp.); Dr. H. Herbert Fox (Hoffman-La Roche, Inc.), and Albert Gessler (Esso Research Labs.) Moderator: Dr. Allan R. A. Beeber of Keuffel & Esser Co. For dinner reservations ($4.25): Dr. J. F. Mahoney, Merck & Co., Inc., Rahway, N. J. Telephone: FUlton 8-1200, Ext. 3254.

Jan. 9, 1958. Pennsylvania Chapter. Dinner and Meeting, Penn Sherwood Hotel, Philadelphia, Pa. Award of Honor Scroll to Dr. Glenn E. Ullyot, F.A.I.C., of Smith, Kline and French. Dr. Richard T. Arnold of Alfred P. Sloan Foundation, will introduce Dr. Ullyot, who will speak on "Development and Requirements of Creativity." For information, Dr. T. M. Immediata, International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.

Jan. 14, 1958. New England Chapter. Dinner and Meeting, House of American Academy of Arts and Sciences, 280 Newton St., Brookline, Mass. Award of Honor Scroll to Dr. John A. Timm, Director, School of Science, Simmons College. Dr. William A. Park, President of Simmons College will introduce Dr. Timm, who will speak on "Sputnik and Science Education." Reception: 5:30 p.m. For information: Dr. A. E. Frost, Eastern Research Lab., The Dow Chemical Co., Framingham, Mass.

Jan. 14, 1958. Washington Chapter Luncheon, 12:15 p.m. O'Donnell's Sea Grill, 1223 E. St., N.W., Washington, D. C. Speaker: Dr. Milton Harris, F.A.I.C., Vice President, Director of Research, The Gillette Co., and President, Harris Research Labs. Subject: "A Few Observations of a Chemist at Home and Abroad."

Feb. 4, 1958. Niagara Chapter meeting. Details to be announced.

Feb. 7, 1958. New York Chapter with New York Section of American Chemical Society. Speaker, W. E. Fairbanks, Thomas J. Lipton, Inc., Hoboken, N. J. Subject, "Chemists' Employment Agreements."

Feb. 18, 1958. AIC Board of Directors and National Council Meeting, The Chemists' Club, 52 E. 41st St., New York 17, N. Y. Board meets at 5:30 p.m.; Council at 6:00 p.m.

Mar. 6, 1958. Twin City Chapter, joint meeting with the American Chemical Society, American Institute of Chemical Engineers, and Industrial Chemists' Forum, Town & Country Club, St. Paul, Minn. Dr. Otto Eisenschiml, F.A.I.C., Scientific Oil Compounding Co., Chicago, Ill., will speak on "Present Day Problems of Our Profession." For information: A. C. Holler, 3514 Taylor St., N. E., Minneapolis 23, Minn.

Mar. 11, 1958. New Jersey Chapter. Visit to Anheuser-Busch Brewery. Details to be announced.

Mar. 20, 1958. New England Chapter Dinner. Speaker, Dr. Henry B. Hass, AIC President.

Apr. 1, 1958. Niagara Chapter meeting. Details to be announced.

Apr. 3, 1958. New York Chapter. Young Chemists Meeting. Details to be announced.

April 10-11, 1958. Thirty-fifth Annual Meeting. THE AMERICAN INSTITUTE OF CHEMISTS. Ambassador Hotel, Los Angeles, California. Host: The Western Chapter.

May 13, 1958. New Jersey Chapter. Honor Scroll Meeting. Program to be announced.

June 3, 1958. Niagara Chapter Meeting. Details to be announced.

June 4, 1958. New York Chapter. Annual Dinner Meeting and Honor Scroll Award. Details to be announced.

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—Monroe E. Spaght

(*Speaking before the Institute of International Education*)

The 13th Purdue Industrial Waste Conference will be held May 5-7, 1958, at the Purdue Memorial Union Building, Lafayette, Indiana. Registration blanks are available from Don E. Bloodgood, Prof. of Sanitary Engineering at Purdue University.

Dr. Everette M. Burdick, F.A.I.C., of Coral Gables, Florida, has been appointed consultant to head the New Products Division of Florida Citrus Mutual, Lakeland, Florida.

Honorary AIC Membership Presented to Dr. Arnold O. Beckman

DR. ARNOLD O. BECKMAN, president, Beckman Instruments, Inc., Fullerton, California, was presented with Honorary AIC Membership at an informal meeting of the Western AIC Chapter in Los Angeles, California, on November 19th.

Dr. Alfred J. Webber, chairman of the Chapter, presided.

The presentation of the Honorary Membership Certificate was made by Dr. Harry L. Fisher, former president of the AIC, and presently councilor-at-large.

(A summary of papers presented at this meeting will appear in the February CHEMIST.)

The citation to Dr. Beckman reads:

Arnold Orville Beckman

In appreciation of his notable contribution and leadership in the instrumentation of analytical and process chemistry, the service he has rendered these fields by the creation of a large manufacturing enterprise, and his devoted organizational efforts in the interest of his fellow man.

The Analysis Instrumentation Division of the Instrument Society of America will hold its annual symposium, May 12-14, at the Shamrock Hilton Hotel, Houston, Texas. Subject, "New Principles in Instrumental Methods of Analysis." Papers are solicited by R. D. Eanes, Program Chairman, c/o Leeds & Northrup Co., Philadelphia 44, Pa.

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Starting salaries for graduates in chemistry and chemical engineering are up 8 per cent, with $675 a month the median for Ph.D. engineers, according to a survey reported in *Chemical & Engineering News,* Oct. 28, 1957. The median figure for starting Ph.D. chemists was $650. That for M.S. degree holders was $525 for chemical engineers and $485 for chemists. For those with B.S. degrees, starting salaries were given as $460 and $435 a month.

Merit Scholarships are available to qualified male high school seniors in counties in the U. S. where The Glidden Company of Cleveland, Ohio, operates a plant or branch office. The scholarships are administered by the National Merit Scholarship Corporation.

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Jomac Inc. of Philadelphia and James North & Sons Ltd., of London, have organized two new firms: Jomac-North, Inc., in Philadelphia, and North-Jomas Ltd., in London. H. Howard Colehower is president of the former and a director of the latter corporation. Jomac-North, Inc., will manufacture polyvinyl chloride protective clothing developed by James North & Sons, Ltd.

The American Society for Testing Materials will hold its annual meeting at the Hotel Statler, Boston, Mass., June 23-27, 1958. An exhibit of scientific and testing apparatus and laboratory supplies and the 12th Technical Photographic Exhibit will be featured. Information concerning entries for the photographic exhibit may be obtained from E. W. Walsh, Chairman, ASTM Photographic Exhibit, The Narragansett Electric Co., 15 Westminster St., Providence, R. I.

The Society for Applied Spectroscopy will meet, February 4th, at the Coffee Shop, Hotel New Yorker, New York, N. Y., at 8:00 p.m., to hear papers on Emission and Absorption Spectroscopy.

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Some Practical Aspects of the Brainstorming Technique

(Let Creative Minds Set Off a Chain Reaction!)

John H. Schneider

Patent Counsel, Abbott Laboratories, North Chicago, Illinois

(A paper, here condensed, which was presented at a recent meeting of the Chicago AIC Chapter)

WHAT is creative thinking? Dr. Charles A. Thomas, F.A.I.C., president of Monsanto Chemical Company, has used the term "adventurous thinking",[1] which conveys more of the real significance behind this mental activity than does "creative thinking". As it applies to science, he defines it as a mercurial and ephemeral disposition of the mind, virtually impossible to measure quantitatively. It is not a simple concept. He says:

> "Some attributes of the creative mind are accepted almost as axioms. For example, curiosity, imagination, enthusiasm and a high level of mental energy. But in a more searching analysis we come to that delicate, difficult question: What factors caused these qualities of curiosity, imagination and energy to be used creatively?
>
> "Picture five men on a life raft, where nothing short of a miracle of ingenuity is required for survival. Four may give up both hope and effort and become suicidal; one, by clear creative or adventurous thinking, devises a means of survival that saves them all."

There were numerous examples of this during World War II. This type of creativity has been capsuled into the phrase, "Necessity is the mother of invention." In the everyday pursuit of scientific endeavor, it is difficult to visualize continuing influence on the part of necessity. In our present-day laboratories, the well-fed chemist would find it difficult to whip up daily a crisis that would bring forth the sharp peak of mental activity resulting in a life or death surge of "creativity through necessity."

Consequently, we need other stimuli for creative thinking, if we are to make progress at the pace called for in the modern world. There is, however, the optimum situation in which the scientist provides for himself the environment conducive to creative thinking. Quoting Dr. Thomas again,

> "In every mind there must be a personal room for 'playing with ideas'. It should be a place of joy and refreshment where the imagination can roam freely up and down any avenue of thought that strikes the fancy; a place one can return to with an adolescent's enthusiasm untethered by convention or autocratic restraint. When the going is roughest, it is most difficult to slip away to this room; but that is when creative people have the greatest need for this retreat. It is within this chamber of the mind that creativity and fresh thoughts flourish best."

Having had the privilege of knowing Dr. Thomas, and of observing the results of his remarkable faculty for creative thinking, it is easy for me to visualize the ease with which he can slip into his mental inner sanctum

1. Thomas, C. A. "Attributes of the Creative Mind." Think. April, 1956.

and emerge later with ideas so startling that it takes years for others to recognize their full import.

There are times when an individual can, by sheer weight of his own enthusiasm, get a group to match the pace which he sets for himself. It is more common to find a group discussion evolving into a relatively barren and fruitless endeavor. Some say that group discussions, or conferences, fail because of "Smugnosis", a term coined by E. G. Reed of Originality House, Inc., who defines it as a disease of the judgment in which the individual arrives at negative conclusions with insufficient information. A Smugno is one who suffers from this disorder. Smugnos have the tendency to oppose all they do not understand, or that is new, or that does not have general acceptance. Smugnosis is not the most common problem in group thinking.

In 1953, Alex Osborn published *Applied Imagination—Principles and Procedures of Creative Thinking.* "Certain attitudes," he said, "favor the production of ideas, while other attitudes adversely affect ideation." Almost any proposed idea can be shown to be wrong, immediately and logically. Sometimes the proof is so convincing that we are tempted to discard further thought about it. Even when this negative attitude is associated with high intelligence, the result is not likely to be creative.

As Mr. Osborn puts it, our thinking mind is two-fold; (1) the judicial mind which analyzes, compares and chooses. (2) the creative mind which visualizes, foresees, and generates ideas . . . Judicial effort and creative effort are alike in that both call for analysis and synthesis, but the end product of the judicial mind is a verdict, while the end product of the creative mind is an idea. Whereas judgment tends to confine itself to facts in hand, imagination has to reach out for the unknown.

Judgment grows automatically with the years, while creativity dwindles unless it is consciously kept up. The fact that moods will not mix largely explains why the judicial and the creative tend to clash. The mood for judicial thinking is largely negative. Its typical question is, "What's wrong with that?"

Creative thinking calls for a positive attitude of hope and enthusiasm. We have to encourage ourselves to the point of self-confidence. We have to beware of perfectionism lest it be abortive. We need to form the habit of reacting "Yes" to a new idea; think of all the reasons why it is good. There will be plenty of people to tell you why it won't work! Judgment and imagination can help each other if kept apart. In creative effort we have to be a Jekyll-and-Hyde. At times we must turn off our judicial mind and light up our creative mind.

Especially in approaching a creative problem, we should give imagi-

nation priority over judgment and let it roam around our objective. We might make a conscious effort to think up the wildest ideas that could possibly apply. One of them might turn out to be as sensible as a door key!

There is no need for decision as to the relative merits of our ideas until we must decide which is to be used. Then we should be as cold in our criticism as we have been warm in our enthusiasm during the creative process. Since personal judgment is seldom as objective as it should be, seek to test the idea rather than merely give an opinion on it.

Self-discouragement stifles creativity. Our creative efforts will always breed discouragement by others as long as nearly everyone likes to throw cold water. Self-confidence used to be an American trait. Has the style changed and complacent modesty become the mark of the scientist? There is a tendency on the part of scientists today to conform, to become conventional in their approach. Convention is a great discourager of originality. The fear of looking foolish goes with wanting not to seem different. Which is worse, to look foolish to others or to look foolish to ourselves? Truly intelligent people admire creative effort, realizing that almost all of the good in the world came from ideas that many condemned as foolish.

Nothing in this world is completely black or completely white. When two persons or groups hold firmly to different approaches to a problem, it is likely that both sides have merit and both lack something which makes neither the best solution to the problem. The true "plus solution" is one which benefits from the plus and minus values of each and derives a course of action, which in the ultimate usually draws in factors previously overlooked by both sides.

Brainstorming is not limited to group endeavor. In simple terms, it means freewheeling of ideas, with the exercise of the creative rather than the judicial mind. It involves an approach that is as free from convention, evaluation, and criticism as possible. To a scientist with confidence in his ability to use his mind freely, who can visualize the technique as an avenue to the unknown where ideas are as plentiful as stars in the heaven, brainstorming offers one of the most satisfying adventures that can come to a human being.

But brainstorming is a type of mental discipline that suits some more than others. Some are inclined to be too analytical or judicially minded to feel comfortable at it. Consequently the discipline becomes a chore and loses its real value to such persons. Others may not have the temperament that recognizes brainstorming as a mental discipline and to them it may deteriorate into a mere pastime. That leaves a much smaller group to whom the discipline has a real significance.

In any group of scientists whose experience in the industrial world

ranges from one to fifteen or more years, the youngster can hold his own nicely with the seasoned researcher, when it comes to brainstorming. The creativity curve seems to start at a relatively high level and maintains that from three to five years. Then it dips for a few years—possibly that is the period where the tendency to succumb to the conventional approach is greatest. After that there is another upsurge which will vary in amplitude by the ability of the individual to develop his earlier creative ability and to resist the conventional approach.

If brainstorming can be undertaken satisfactorily by the individual, why do we contemplate it as a group activity? The good reason is the chain-reaction that takes place when a group of top-notch brainstormers pool their efforts in freewheeling of ideas and exercise the mental discipline that sets aside a brief period to devoting full attention to the use of the creative mind. When thus undertaken, the experience is nearly as startling as a nuclear implosion.

What would be the result of bringing together a super-team of top-notch brainstormers? I had the pleasure of observing such a team in action in Cleveland in April 1955. It was a wonderful thrill to see them perform. Ideas, excellent ideas, emerged so fast it was difficult to record them all!

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A study is being made of the types of problems most likely to demonstrate the real value of such a super-team. These studies are not complete, but it appears that the long-range problem is likely to rate high on the agenda for the super-team.

Brainstorming as a group technique, therefore, is essentially the utilization of a truly creative mental discipline in a chain-reaction environment. The technique is relatively new and there is much to be learned through experience.

We are emerging from the fossil-fuel age into a wholly new era in which the pace cannot be measured in terms of conventional procedures. Surely the human mind is capable of achieving a level of ideation far in excess of the relatively limited demands made upon it in the past. The

indications are there. It remains to carry forward those techniques most likely to develop in our scientists the most effective mental disciplines for adventurous thinking. At best, this will be little enough preparation for the challenges of the rapidly evolving age of nuclear experience.

Since the best techniques that we have been able to develop thus far may be only forerunners of techniques yet to be conceived, I would quote Dr. Fred Olsen, vice president for research and development of Olin Industries, in a monograph (Industrial Research Institute, 1952), on "The Nature of Creative Thinking":

> "Perhaps we shall find that the greatest invention will be to discover workable methods of inventiveness and a feasible technic for creative thinking."

An "Orphan Ideas" Committee has been set up by Standard Oil Company (Indiana) to evaluate ideas which its scientists may have outside of their regular research fields. "We want to encourage broad thinking," explained Dr. P. C. White, manager of research.

About AIC Members

Dr. Saul Gordon, F.A.I.C., and Clement Campbell have established a research and development consulting laboratory for the application of thermoanalytical research techniques, under the name of Gordon and Campbell, consulting chemists, at 12 Brookfield Way, Morristown, N. J.

Dr. Roger W. Truesdail, F.A.I.C., president of Truesdail Laboratories, Inc., Los Angeles 65, Calif., was re-elected secretary of the Council of Independent Laboratories, at its annual meeting in Tulsa, Okla., in November.

Dr. John R. Bowman, F.A.I.C., joins Northwestern University at Evanston, Ill., this January first, as associate dean of engineering and professor of science-engineering.

John H. Nair, F.A.I.C., assistant director of research, Thomas J. Lipton, Inc., Hoboken, N. J., was named chairman of the Planning Committee for the American Chemical Society's $3,000,000 building-fund campaign.

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Dr. Foster D. Snell, F.A.I.C., president of Foster D. Snell, Inc., New York, N. Y., was elected chairman of the Eastern Division, American Council of Independent Laboratories, Inc. to serve for 1958. **Dr. Murray Berdick,** F.A.I.C., of Evans Research & Development Corp., New York, N. Y., was elected vice chairman.

Prof. Ray Q. Brewster, F.A.I.C., chairman of the Department of Chemistry, University of Kansas, Lawrence, Kansas, received the Midwest Award of the St. Louis Section of the American Chemical Society, November 8th. He was cited "for his achievements as an outstanding educator, a counselor of students, a research director, an administrator, a textbook writer, and as an ambassador of chemistry."

Dr. W. David Stallcup, F.A.I.C., vice-president, Southern Chemical Division, The Glidden Co., at Jacksonville 1, Florida, announces the commercial availability of synthetic geraniol.

David H. Killeffer, F.A.I.C., consultant, Tuckahoe 7, N. Y., has completed a "History of The Chemists' Club." This beautiful book was specially illustrated by George Hollrock and printed by the Peter Pauper Press.

Dr. C. C. Winding, F.A.I.C., director, School of Chemical Engineering, Cornell University, Ithaca, N. Y., spoke at the Recognition Dinner to honor Prof. Fred Hoffman Rhodes, in New York, N. Y., Oct. 28th. Dr. Rhodes founded the Cornell School of Chemical Engineering. **Dr. Sidney Kirkpatrick,** Hon.AIC, editorial director of *Chemical Engineering* and *Chemical Week,* was toastmaster.

Dr. Robert T. Armstrong, F.A.I.C., vice president and technical director of Celanese Corporation of America, announces that the company's new Polyolefin Pilot Research Laboratory at Summit, N. J., is now in operation.

(*Continued on page* 22)

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After Retirement—What?

FACED with out-of-date retirement regulations and repelled by the prospect of total inactivity, what do scientists choose to do for a "second career" when the compulsory retirement age interrupts their interests and abilities?

Here are two contrasting after-retirement careers chosen by two AIC members: Dr. Eric C. Kunz, F.A.I.C., retired president of the Givaudan Corporation, Inc., and Dr. W. T. Read, Hon. AIC, very recently retired from government service. They are men of contrasting temperaments. Dr. Read loves city life, the stimulation of many people, the proximity of well-stocked libraries, the near sources of information, and the pleasure of bringing new scientific knowledge to the attention of both scientists and non-scientists.

Dr. Kunz loves the long vistas of mountains and forest (a heritage from his boyhood in Switzerland), the peace of good country living, the pleasure of entertaining friends, the challenge of applying scientific principles to normally unscientific occupations.

Dairy Farming

Dr. Kunz, who retired several years ago, and his charming wife chose dairy farming on 360 acres, deep in the beautiful Blue Ridge mountains near Fletcher, N. C., where they keep about 135 Holstein and Brown Swiss cows, and live in a luxurious hill-top home, with a magnificent view.

We asked, *how do you like dairy farming?*

Dr. Kunz: "Very well indeed, and it seems to agree with me. The farmer feels that he has both feet on the ground! As we say, all he is growing, he can eat sooner or later in one form or another! He is not much concerned with inflation. During periods of inflation, when government bonds go down in value, farm values go up. A farm as a going concern is really the best hedge against pernicious inflation."

Do you recommend farming as an occupation for retired chemists?

"I do not recommend that everyone should buy a farm. If you want to farm you must love farming and hard work. You must get up at 5 a.m. in summer and 6 a.m. in winter and get used to working more than ten hours a day. The days of the small farm are over, when you could buy a small farm with a small investment and then make a living. If you try it today, you will 'lose your shirt,' as so many have done. In order to be in the black running a dairy farm, as I do, you must produce close to a ton of milk a day, and have a good market nearby for Grade A milk (also called fluid milk) which commands the highest price. Then you must have good land, and if possible, grow all the feed you need. That means, in this part of the country, an

investment of more than $200,000 in land, buildings, cattle, machinery, and other things."

Why is the small farm no longer profitable?

"Federal and state governments are mainly responsible for this unfair condition of the 'poverty-stricken farmer, as Rep. Rayburn called him in his pre-election speeches. The farmer is the 'milk cow' of the industrial worker, who commands more votes than the steadily dwindling farm population. Votes count. Though the farm population is little more than half of what it was prior to World War I, the staffs of the federal and state agricultural departments have been doubled and in many cases tripled. These people, mostly graduates of the state agricultural colleges, are going from farm to farm, pushing the farmer to produce more and more. These personal visits are accompanied by the distribution of appropriate literature bringing the latest news on improved methods of growing this and that; how to get twice the yield of corn per acre; twice as much milk per cow. Add to this the daily advice from the Farm Extension Service over radio and television and you can understand why we have these costly surpluses. But they are wanted by both the distributors and the governments to please the industrial worker, since by keeping down the price of food, the average man's pocket cash is increased to buy automobiles, television sets, and luxuries, and so it keeps the wheels of industry turning. Those are the reasons why no government, state or federal, republican or democratic, will ever find a solution to the 'farm problem.'

"But what the farmer has to buy: Labor, machinery, repairs, etc., is going up every year. What he sells does not go up because of the great overproduction, though the prices to the consumer are pushed up by the distributors. Mass production is the only hope for the individual farmer. That is what I am being forced into since I have to sell my milk at the same price as I did six years ago."

Do you like living in the mountains of Western North Carolina?

"Yes, indeed. It is the best part of the United States from a climatic point of view, not too hot in summer and not too cold in winter. That is the opinion, also of the U. S. Weather Bureau. The scenic beauty is probably the best in the U.S.A. Farming in a flat country, like that in the best farming counties of Iowa or Illinois would not interest me. It is this combination of good climate, scenic beauty, and good farm conditions, which create my happiness."

Does a chemist have an advantage as a farmer?

"Yes, indeed, a great advantage. The theories of farming are all chemistry. Whatever you do on the farm has a chemical significance. It is a difficult chemistry since so many factors enter into it: Soil, fertilization,

the right amount of water for the growing processes at the right time; the insecticides and pesticides needed and their proper application; harvesting and curing processes for crops; the preservation provisions, etc. Now we have more than a dozen good farm journals which tell you such things as how to get 125 bushels of corn per acre when 35 bushels per acre was considered a good return only 20 years ago. But keep in mind that none of these publications has real scientific value. None gives the exact conditions under which the desired return was obtained. No soil analysis is given, nor is the amount of rainfall, daily or even weekly, recorded. Yet these two conditions can be responsible for yield variations up to 50%. Perhaps some day the federal and state departments of agriculture will recognize this weakness in our agricultural research, and, though it will take a long time, we will then have better, though perhaps less spectacular, farm publications."

You have many chemical patents in your name. Have you given up your profession as an inventor?

"No, not at all. But my field of action has been shifted from organic chemistry, cosmetics, and perfumes, to improvements in farm operations! One farm patent has been issued; another is still pending. For example, my soil here is full of mica. It is glittering all over with a silvery shine in the sun. So I started to take an interest in the mica industry to get acquainted with its operations. From that a patent application resulted which has just recently been issued. Improvements, inventions, are made mostly in the field one is living with. You make observations and start thinking how to improve this or that operation. That is why you can not close an inventor into a laboratory and restrict him in his field of observations. Constant stimulation is needed to get ideas and bring clarity into his thinking. The country is spending formerly unheard of sums of money on research. I feel sure half the money now spent could produce more results, if the inventors would be given a chance to invent. An inventor has to be acquainted with many facts from other sciences to progress and do creative work in his own science. That is why older and experienced inventors should be in charge of research organizations and research problems. It is easily possible that a technique for younger inventors could be worked out which would help to make possible faster progress in solving problems. Such a technique would not replace one's ability to observe and draw the right conclusions, but it should serve as a kind of guide to where the observations should be made and what value should be given to them."

Do you miss the companionship of other scientists here?

"There are some here. However, it is hard for me to understand why

research organizations do not discover this area, where the climate would be so helpful to agreeable living and to good thinking. I hope you will tell the members of THE AMERICAN INSTITUTE OF CHEMISTS that if they are traveling in this area at any time, I shall be very glad to see them, or to answer their questions about dairy farming."

Technical Writing

DR. W. T. READ, Hon. AIC, will be remembered by many AIC members for his fine work on the Chemists' Advisory Council during the 1930's and for his activities on AIC committees. He is just beginning his retirement career as of January first, though he was officially retired from government service on Oct. 31, 1957. Work as an advisor on an Army contract occupied him during November and December.

Dr. Read enjoys city life in Washington, D. C., at the Commander Apartments, 1225 13th St., N.W., and he would prefer to remain there. Therefore he has carefully considered his personal inclinations while making a choice of his "retirement career," as he points out in a letter to his friends:

"I am not in the class of the happy people in the magazine ads who hunt, fish, and loaf in Florida sunshine! I am neither a hunter nor a fisherman, though I can do some intelligent loafing! Neither am I inclined to look for an inexpensive place in the country, since that is likely to be remote and without contacts with a library, educational institution, or professional colleagues. But I do want to keep active as long as I have my present health and vigor, and to enjoy myself while keeping busy, interested and useful. My preference is part-time activity, something that I can carry on in my own study or office.

"Here are some of the things I would like to do, some of them simultaneously, and others as a sole, part-time activity:

"Technical writing, including popular books or articles on chemistry and its applications; collaboration with chemists and chemical engineers who have the material but no time to put it together, and the preparation of technical books, miscellaneous editing, indexing, and abstracting.

"Representative in Washington of smaller contractors, such as educational institutions and research foundations, which do business with the Department of Defense, but which find sending members of their own staffs on frequent visits somewhat expensive.

"Special consultant for companies which do not have full-time Washington representatives, but which require information and advice which is only available from Government agencies or from libraries in Washington.

"Occasional popular lectures on science, a type of work I once did for

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some two years while with a civilian agency.

"Executive secretary for a small, non-profit foundation on a part-time basis.

"Most of these activities require a residence in or near Washington which I would prefer, although I might consider other activities, such as teaching chemistry as visiting professor in liberal-arts or teachers' colleges. I was head of the Department of Chemistry at Texas Technological College for five years, and dean of the School of Chemistry at Rutgers University for more than a decade, although, since I have never had a course in education, I could not teach in any public school system!

"Finally a return to my original career as a newspaper man, but this time preferably as a special writer for a city daily.

"I think that with fourteen years of intimate contact with government operations, with several fine libraries, and with a very broad acquaintance here and over the country, I ought to be able to keep as busy as my age and health permit, and I prefer a flexible schedule so that I can work mostly in my study at home, and make visits by appointment on various errands.

"I now have one client of more than twenty years standing, *The Encyclopedia Americana.* This work is limited to the field of chemistry and will take only a relatively small fraction of my time. I am also completing a book which I plan to call *Everyday Chemistry for Everybody but Chemists.*

"I shall welcome ideas, suggestions, and advice from my friends in The American Institute of Chemists."

Dairy farming or technical writing —here we have two contrasted occupations chosen by retired AIC members who enjoy being active, useful, and independent during the whole of today's longer life span and equally prolonged mental vigor. The editor will be happy to hear from AIC members who have selected other retirement careers. Please list the temperament and qualities needed to enjoy the occupation, its advantages, and disadvantages, and why you find it pleasurable.

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Kenneth H. Klipstein, F.A.I.C., vice president for operations of American Cyanamid Co., spoke at the dedication of the new Research Center of the Company's Bound Brook, N. J., Laboratories, on Oct. 18th. **Dr. R. P. Parker,** F.A.I.C., general manager of the Research Division, also participated in the ceremony, which was one of the events celebrating Cyanamid's 50th Anniversary.

Dr. Warren K. Lewis, Hon. AIC, professor emeritus of chemical engineering at Massachusetts Institute of Technology, was awarded the "Gold Medal for Distinguished Achievement" by the American Petroleum Institute, at its 37th annual meeting in Chicago, Ill., November 11-14.

John J. Levenson, Jr., F.A.I.C., has recently established the firm of John J. Levenson Jr. & Associates, for general management and chemical consulting work, at 342 Madison Ave., New York 17, N. Y. A brochure will be sent on request.

V. F. Payne, F.A.I.C., retired from the U. S. Army Signal Engineering Laboratories on November first, and joined the Chemistry Department of Monmouth College, West Long Branch, N. J.

H. F. Robertson, F.A.I.C., has been appointed technical director of Union Carbide Development Co., Division of Union Carbide Corp., New York 17, N. Y.

Dr. John E. McKeen, Hon. AIC, received the Department of Defense Reserve Award, given for "outstanding cooperation with the Armed Forces Reserve," at ceremonies on Oct. 16th. Major General Raymond E. Bell, chief of the U. S. Army Military District, N. Y., made the presentaton.

Norman F. Johnston, M.A.I.C., has been appointed director of research and development, Hunt Foods and Industries, Inc., with headquarters at Hayward, California.

Fred J. Emmerich, Hon.AIC, has retired as chairman of the board of Allied Chemical & Dye Corporation, New York 6, N. Y., after thirty-seven years of active service as an employee and officer of the company. He will continue on the Board as a director.

Dr. Fritz Rosenthal, F.A.I.C., has been promoted to director of product development by Knowlton Brothers, Watertown, N. Y.

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Understanding the Creative Process

Dr. Maurice J. Kelley, F.A.I.C.
Director, Industrial Specialties Laboratories, Nopco Chemical Co., Harrison, New Jersey

(This is Part III of a series which started in the November, 1957 CHEMIST)

Part III. Who is Creative and Why

MOST writers agree that everyone possesses some natural creative talent. Some say that very few of us show it, but even these writers agree that the latent potential is there, and that mental and social factors prevent people from fully utilizing their creative ability. Thus, most of us can greatly improve our actual creativity. Even among researchers, who are trained to be creative, only 10% of them contribute 90% of the creativity. One estimate[1] says that only 2 persons in 1,000,000 actually lead truly creative lives; if so, this means less than 350 truly creative people in the United States.

The importance of Will and Emotions becomes evident. Thinking is hard work, especially creative thinking. There must be the will and drive, but unfortunately these fluctuate widely from time to time in most people, causing great variations in a single person's creativity. Witness the great bursts of creativity that result under the stress of war or emergency! Variations in will and drive, therefore, for most people, exert a greater effect on actual creativity than does the level of knowledge or native creative ability.

Commenting on society's and the individual's inability to develop the maximum of potential talent, H. G. Wells said, "England alone in the last three centuries must have produced scores of Newtons who never learned to read; hundreds of Darwins, Daltons, Bacons and Huxleys who died in stunted hovels."

Some have said that creativity is greatest among younger people; it has even been said that the peak occurs at 35 years of age or earlier. Professor H. C. Lehman of Ohio University has studied the creative contributions made in many separate fields of endeavour,[2] and he almost invariably found that the ages at which the maximum of contributions appeared were in the thirties. But he also points out that loss of creativity with increasing age is not necessarily so, and can be avoided if one maintains the will and drive, and does not allow his judicial thinking to submerge his natural creativity.

Creative attitudes are most unhampered in early childhood, but tend to become restricted more and more by the processes of formal education.

1. Hunt, Morton H. "The Course Where Students Lose Earthly Shackles." Life. May 16, 1955.

2. Osborn, Alex F. "Applied Imagination—Principles and Procedures of Creative Thinking." Book: Chas. Scribner's Sons, New York (1953).

Subsequently most people, even including scientists, further retreat from true creativity to an attitude that is usually negative. Von Fange[3] illustrates these attitudes and tendencies in Graph 1, where we also see the diagrammatic representation of the return to maximum positive creative attitude by creative practice, and the deliberate alternation between creative thinking and judicial thinking as the situation demands.

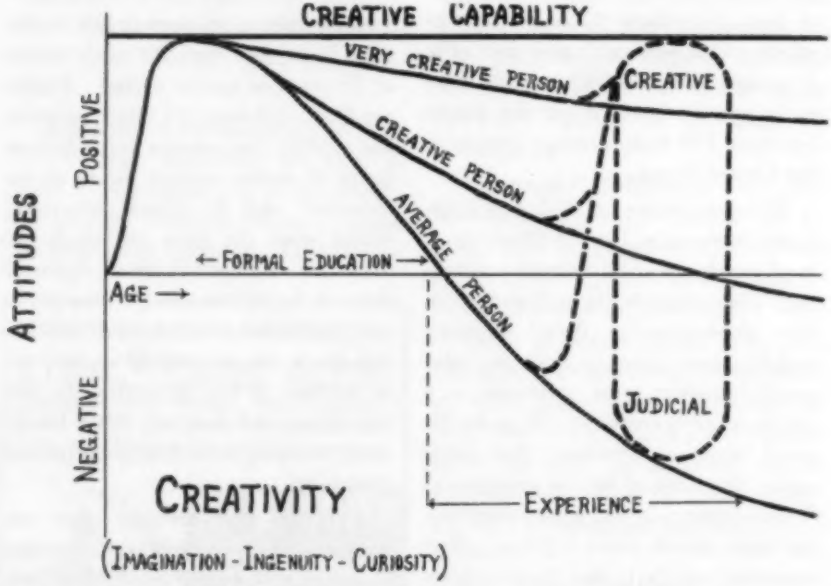
Actual creativity can be improved by:

(1) Understanding the thinking process
(2) Understanding the creative thinking process
(3) Conscious effort, training and practice
(4) Accepting the challenge of the difficult and the unknown

As Maslow[4] has said, "The Proper place for the scientist—once in a while, at least—is in the midst of the unknown, the chaotic, the dimly seen, the unmanagable, the mysterious, the not-yet-well-phrased".

3. Von Fange, E. K. "Understanding the Creative Process." Gen. Elec. Rev. **58**, 54-7 (July) 1955.

4. Maslow, A. H. "Problem-Centering vs. Means-Centering in Science." Phil. Sc. **13**, 326-31, 1946.



BY E. K. VON FANGE; MODIFIED BY M. J. KELLEY

Graph I

Traits Important to Creativity

Dr. Donald Walker, of the University of Chicago, tested a large group of scientists noted for original contributions[5]. He was looking for attitudes and abilities thought to be essential to creativity. Here is what he found.

Table 5

Abilities	*% Incidence*
Flexibility of Approach	55%
Ability to Concentrate	39%
Copious Flow of Ideas	33%
Originality of Response	28%
Sensitivity to Environment	22%

The principal writers on creativity mention a wide variety of mental and emotional traits, including the above, which are helpful to creativity. These groups of traits, mental and emotional, are shown and briefly described in Table 6.

Table 6

Traits Favorable for Creativity

Mental

Knowledge (its breadth enlarges scope of creative possibilities)
Capacity for Self-Instruction (to increase knowledge)
Ability to Learn Quickly (increases knowledge quickly)
Keen Observation (sensory acuity; finds clues; a new uncertainty is apt to be more useful than an old truth)
Photographic Memory (feeds the imagination; aids association)
Well-Organized Mind (helps in rearranging facts and ideas)
Good Reasoning Power (to evaluate and test our ideas—at the right time)
Good Vocabulary (most people think in words)
Vivid Imagination (especially visual imagery)
Ability to Concentrate (to stay in focus on the problem; avoid distraction)
Inquiring Mind (scientific curiosity; questioning attitude; skeptical)
Sensitivity to Problems ("a nose for", even before they are stated)
Ability to See Real Problem—no matter how well or poorly it may be disguised
Fluency of Thought (more ideas per unit time; less inhibition of the subconscious source)
Flexibility of Thought (knows when to abandon false leads; can leap around)
Originality of Thought (power of association; ability to relate variant ideas; ability to be generic; "read between the lines")

Emotional

Ambition (researchers are more apt to be altruistic)
Persistence (stubborn will to solve the problem no matter what the difficulties; this is found in and counseled by the great creative thinkers)
Inner Drive (energy)
Self-Confidence
Motivation (necessary; but too much is bad: accepts first solution, sees erroneous solution)
Willingness to Gamble (the solution may destroy the present situation)
Enthusiasm (interest)
Emotional Capacity (emotions dominate and stimulate creativity)
Working Mood (start now; take paper and pencil)
Adjust to New Situations
Courage (correct answer may be unpalatable; be ridiculed)
Pioneering Spirit ("daring"; thinking beyond colleagues)
Unconventional (tries new paths, also makes them)
Constructive Discontent (with things as they are; wants to make them better)
"I'll show you" Attitude (friendly rivalry)

5. Green, E. I. "Creative Thinking in Scientific Work." Elec. Eng. **73**, 489-94, 1954.

Serious thinking of any kind is hard work, is seldom spectacular, and is often unappreciated. Creative thinking requires all-out concentration—"Aufgabe"—and the will power and effort to maintain a complete immersion of one's self in the problem .

The Enemies of Creativity Within Us

While all are born with considerable curiosity and imagination, unfortunately somewhere between childhood and adulthood the great majority of us lose or fail to use and exercise these capacities. A follow-up on 1000 children with I.Q.'s over 140 showed that a very few became creative adults.

Formal education requires us to learn a great body of facts, and to solve many problems for which there is but one correct answer. Formal education also subjects our learning to criticism, and teaches us to judge and criticize. The natural creative disposition which develops in the five-year old child is quickly lost, and in the adult is very likely to be changed to a set of negative blocks to creative activity. Arnold has thoroughly treated this problem of blocks to creativity[6,7], and he classifies such blocks as perceptual, emotional and cultural. See Table 7.

Naturally, one can list traits inimical to creativity merely by naming deficiencies in the desirable mental and emotional abilities. Thus, limited intelligence or knowledge are detrimental, but can be improved. The dominance of judicial functions has been mentioned several times, and the remedy is to learn to turn our judicial functions on or off at will.

The enemies of creativity which are of emotional origin probably are much more serious in their effect on creativity. Some of these are commented on below, and the first four of these result from a lack of, or poor, motivation.

Poor Motivation

1. **Inertia** (passivity, or just simple laziness)
2. **"Hunch" Thinker** (too lazy to work his mind, so waits for "hunch")
3. **Contentedness** (this leads to lack of interest, and inertia)
4. **Maintain Status Quo** (satisfied with things as they are, and will exert great effort to keep from changing things. This is very apt to exist in and grow stronger in the business man or executive who has achieved a considerable degree of success in his career. Having already realized most or all of his goals, he views anything radically new or daring as a threat to his comfortable position. Perhaps even only subconsciously, he becomes non-creative and opposed to creativity in others.)

Other Impediments:

5. **Lack of Confidence** (self discouragement)
6. **Wishful Thinking** (favoring one's own ideas; use of heart instead of mind)
7. **Ego-Centricity** (others can think, too. Stokes[8] discusses "scientific snobbery"; e.g. Ph.D.'s thinking that less educated people or non-

6. Arnold, John E. "Personal Development—An Individual Approach." Machine Design, **28**, Jan. 12, 95-6, 1956.
7. Sharp, H. T. "Here's How to Get Ideas in a Hurry." Chem. Eng. **63**, 218 (July) 1956.
8. Stokes, C. A. "Human Problems of the Research Director." The Chemist **32**, 339-44, 1955.

scientific ones are less intelligent or less creative. Kettering describes an inventor as one who doesn't take his education too seriously.)

8. **Harassment** (by detail, or pressure. One of the surest ways to kill creativity is to keep a man struggling too long on a too-small problem[9].)

Table 7

Blocks to Creative Activity

Perceptual — prevent getting adequate, true, relevant information.

1. Faulty Observation.
2. Failure to Distinguish Cause and Effect
3. Failure to Relate Problems to Their Environment
4. Failure to See the "Trivial" or the "Obvious"

Emotional—fears, motivation, etc.

1. Jealousy
2. Prejudice (preconceptions, "closed mind", reactionary spirit)
3. Fear of Ridicule (or of making a mistake, being out of line, or of spoiling a record for sound judgment)
4. Compulsion to Conform
5. Over-Motivation (desire for speed causes one to narrow the field, concentrate on the obvious, and "see" an erroneous solution)

Cultural—all the pressures which shape our thinking.

1. Traditions
2. Training
3. Environment
4. Social and Job Pressures
5. Resistance to Change

All of these blocks lead to "red-light thinking". Relative to one kind of perceptual block, Luigi Galvani says, "It is easy to deceive one's self into believing that he has found just that which he has set out to discover". Von Fange urges that we distinguish between conformity by psychological compulsion and conformity by choice. It is often desirable to conform to some parts of creative work, to promote efficiency of the team effort[10]. While conformity tends to deal harshly with novel opinions and ideas, it also causes ideas not to be expressed. What is still worse, it even prevents ideas from arising in the mind. At the same time, one must avoid deliberate non-conformism merely for its own sake. It is much better to be sincerely independent[11].

Knowing the dangers, and being able to see their emergence in specific cases in ourselves, is half the battle in overcoming these enemies of creative thinking. Dr. Dana Farnsworth, of M.I.T. said, "The creative thinker can understand himself, recognize when he is becoming fearful, angry, jealous, suspicious, or what have you; and then direct all his energies over into the daring side of things".[12]

(Part IV, "The Creative Thinking Process" will appear in February.)

9. Nelles, Maurice. "Deliberate Creativeness in Science and Engineering." Chem. Eng. News. **31**, 1520-3, 1953.

10. Von Fange, E. K. "Creative Process." J. Eng. Educ. **45**, 508-13, 1955.
11. Whitehead, T. North. "Permission to Think." Harvard Bus. Rev. **34**, 33-40 (Jan.) 1956.
12. Arnold, John E. "Creativity in Engineering." S.A.E. Trans. **64**, 17-23, 1956.

The American Institute of Electrical Engineers will meet at the Hotel Statler and the Sheraton-McAlpin Hotel, New York, N. Y., February 3-7, 1958.

Communications

Type Out of Order

To the Editor:

Please straighten me out. Am I an F.A.I.C. or an M.A.I.C.?

Maybe I missed the fine print somewhere. But here I have a beautifully inscribed document . . . looking like *bona fide* evidence that I am carried on the rolls of AIC as a Fellow. Now I read in THE CHEMIST amongst "Members" my name! (page 433, November, 1957) . . . This disturbs me!

—Dr. Gilbert Small, Jr.
Cambridge, Mass.

Editor's Note: Thank you for straightening us out! We find that a whole block of type was transposed from column 1, page 433, to column 2; and thus Fellow members, Dr. Anthony C. Shabica, Jr., William M. Shine, Albert F. Shorkey, Dr. Marvin O. Shrader, Dr. Gilbert M. Shull, Dr. Maxwell J. Skeeters, and Dr. Gilbert Small, Jr., were placed in the column listing the New Members instead of in the column listing the Fellows!

On Confidential Relationship

To the Editor:

Regarding "Professional Chemists and Unions," THE CHEMIST, October (p. 394), may I add a few words.

In the beginning there were no captive lawyers or captive medical doctors. All lawyers and doctors were in business for themselves and there was a "confidential relationship" between the lawyer, doctor or theologian which the law respected. Thus even the law courts could not force, by contempt proceedings, the lawyer or doctor or priest to divulge the information learned from clients.

With the passing of the Civil War and the growth of the oil, steel, and other industries, the large corporation came into being. By law, a corporation is a being with perpetual life. These corporations found it financially profitable to hire lawyers and medical men as employees. These lawyers and doctors, though captive, were accepted by the legal and medical profession as professionals.

However, in recent times the Patent Office has ruled that there is no confidential or client relationship between an employee lawyer (patent attorney) and his employer (the corporation).

The question arises: Is an employee or captive lawyer of a corporation a professional lawyer? Or is a confidential relationship between a professional and his (or her) client of the essence to a professional status?

If a confidential relationship is not essential, then a learned captive employee-inventor is as much a professional as a learned captive lawyer, both employed by the same large corporation.

As for Dr. Rassweiler's article on

page 375 (October CHEMIST), I believe he fails to note that chemists work for and are servants of corporations (non-human beings), whereas lawyers and doctors work for themselves and serve human beings (with the exceptions noted above of captive lawyers and captive doctors).

—Dr. Frank Makara, F.A.I.C.
New York, N. Y.

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Science Books Sought For Samoa

To the Secretary:

American Samoa, a group of seven islands, became one of the island possessions of the U.S. over 50 years ago. It was under the jurisdiction of the Navy Department until 1951 and is now directed by the Interior Department. I came to Samoa six years ago as a high school teacher and since have become the high school principal . . .

We are interested in giving our students every opportunity to know more of life outside of Samoa. About 50 per cent of students and graduates leave here for the States. Many want higher education but can little afford it; most who leave join the armed forces and do a creditable job. Not all the 9th grade students can enter the high school; we can only take about one-third of them because of building and teacher limitations. This year there were 200 9th grade graduates with no future for further education.

We have a high school library which also serves as the public library. None of our schools are supported by local taxes; rather, most all functions of the local government are supported by a yearly congressional appropriation. Naturally, we must be as economy minded as possible; so there is never much money for publications. . . Would some of your members be interested in sending us magazine subscriptions or in sending books, new or old? We are particularly interested in reference books, but anything is most welcome, non-fiction or fiction. This is a "begging" letter; you would realize why if you knew the dearth of printed matter here.

I would appreciate knowing also if your group sponsors scholarships for deserving secondary students, or sends members on teaching fellowships for combination teaching-research projects? Do you sponsor building projects or equip school rooms? Can you direct me to a right source for answers to such questions

if you do not engage in such projects? Postage rates to American Samoa are the same as domestic rates in the States.

The eventual aim of the U.S. Government is self-government for American Samoa. Anything done to train Samoan youth today will be training the future leaders of Samoa.

All good wishes from American Samoa, America's unknown and almost forgotten island possession.

—Marvin J. Senter
Pago Pago, Tutuila, American Samoa

Pleased

To the Editor:

I was pleased with your arrangement of the August issue of THE CHEMIST. . . . What with Dr. H. A. Shepard's article, "The Destructive Side of Creativity" and the committee report on "The Older Professional Man," the issue certainly dealt heavily with professional problems, which I was glad to see. . .

—Dr. Max Bender, F.A.I.C.
Bound Brook, N.J.

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Wrong Photo Used!

To the Editor:

Where, oh where, did you get that cover picture on the October CHEMIST? It is one which was taken about five years ago, when I was about 20 lbs. heavier, and I thought it had been safely buried!

—Dr. Herman S. Bloch, F.A.I.C.
Chicago, Ill.

Stimulating Thoughts

To the Secretary:

Please accept my thanks to the INSTITUTE for providing many stimulating thoughts on the ethics of the profession, especially through the medium of THE CHEMIST.

—Irving Toplitzky
Maywood, N. J.

Good Salesman

To the Editor:

I feel that such a well-edited and attractive publication as THE CHEMIST is an exceedingly good salesman for the INSTITUTE.

—Martin B. Williams
Huntsville, Alabama.

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June Meeting

(Condensed)

The 316th meeting of the National Council was held June 26, 1957, at 6:00 p.m., at The Chemists' Club, New York 17, N. Y., with President Hass presiding.

The following officers and councilors were present: Messrs.: M. Bender, M. Berdick, A. W. Fisher, Jr., H. B. Haas, F. B. Havens, K. M. Herstein, F. A. Hessel, D. B. Keyes, S. D. Kirkpatrick, J. H. Nair, E. Ott, G. L. Royer, and L. Van Doren. C. L. Brown, chairman, Committee on Professional Education; L. T. Eby, chairman, Committee on Membership; D. Friedenreich, accountant; M. J. Kelley, chairman, Committee to Prepare Manual of Council Operations; J. Kotrady, chairman, Committee on Student Awards, and V. F. Kimball, were present.

Upon motion, the Budget for 1957-1958 was approved.

An inquiry from S. C. Lyons,

F.A.I.C., suggesting that a self-addressed return envelope be included with the bills for dues was presented. The Secretary was asked to use a new form of statement, which when folded, forms its own envelope.

Upon motion, the 1957 Annual Meeting Committee was given a vote of thanks for the excellent arrangements made at the Akron meeting.

Emeritus membership was conferred on the following persons:

Dr. Harry P. Coats
George M. Darby
Burleigh Reed
Dr. Ernest W. Reid

Plans for the 1959 Annual Meeting were announced. It is scheduled for May 14-16, 1959, at the Hotel Traymore, Atlantic City, N. J. with the New York and New Jersey Chapters as hosts.

Dr. Brown reported that the Committee on Professional Education is considering letters about chemistry curricula, and that it will be represented at the Convocation on Education.

Dr. Kelley presented the Manual of Council Operations, and it was decided to publish this in the September issue of THE CHEMIST.

The matter of student awards and the selection of colleges to receive them was referred to the reappointed Committee on Student Medal Awards.

Mr. Havens discussed "Pan American Affiliates", a proposed group desired by the Western Chapter to cover South American students temporarily working or studying in the U. S. The Western Chapter was asked to recommend a member to serve on this Committee.

Dr. Keyes reported the discussions held by a committee of scientists and engineers on the subject of Federal Aid to Education.

The Chapter Representatives reported on the Chapters' activities.

The following new members were elected:

FELLOWS

Aeschlimann, Dr. John A.
Vice President in charge of chemical research, Hoffmann-La Roche, Inc., Nutley 10, N. J.

Finn, John J.
Armour Research Foundation, 10 East 35th St., Chicago 16, Illinois.

Gearman, Arvin T.
Chemist, George T. Walker Co., 2218 University Ave., S.E., Minneapolis, Minnesota.

Johnson, Dr. Kenneth D.
Assistant to Vice President, Atlantic Research Corp., 901 N. Columbus St., Alexandria, Va.

Kaye, Dr. Samuel
Staff Scientist, Convair Scientific Research Lab., 3595 Frontier St., San Diego, Calif.

Kirk, Dr. Paul L.
Professor, University of California, Berkeley 4, California.

Morgan, Dr., Sister M. Sylvia
Director of Science, Professor of Chemistry, Marywood College, Scranton Pennsylvania.

Norris, Dr. Terry O.
Assistant to Director of Research, Keuffel & Esser Co., 300 Adams St., Hoboken, N. J.

Painter, Erle V., Jr.
Director of Research, Chicago Plant, Johnson & Johnson, 4949 W. 65th St., Chicago, Ill.

Robert, Dr. Emery D.
Director of Research, Lady Esther Co., 7171 W. 65th St., Chicago, Illinois.

Schweigert, Dr. Bernard S.
Director of Research & Education, American Meat Institute Foundation, 939 E. 57th St., Chicago 37, Ill. (Also *Associate Professor of Biochemistry,* University of Chicago).

Simon, Simon A.
Internal Consulting Chemist, Research Division, Chicopee Manufacturing Co., Chicopee Falls, Mass.

Solmssen, Dr. Ulrich V.
Technical Director, Warner-Lambert International, Morris Plains, New Jersey.

Spechler, Daniel
Chemist, Group Leader (organic coatings), Keuffel & Esser Co., 300 Adams St., Hoboken, N. J

Steinberg, Eliot
Manager of Research Administration, Research Dept., Warner-Chilcott Labs., Division of Warner-Lambert Pharmaceutical Co., Morris Plains, New Jersey.

Stephenson, Robert M.
Technical Director, Basic Vegetable Products, Inc., Vacaville, California.

MEMBER

Carter, Larry J.
Chemist, Farnam Manufacturing Co., Inc., P. O. Box 5276, Asheville, North Carolina.

ASSOCIATE

Whidden, James J., Jr.
Chemist, W. R. Grace Co., Polymer Chemicals Division, 225 Allwood Road, Clifton, N. J.

RAISED FROM MEMBER TO FELLOW

Vaughn, Dr. Thomas H.
Executive Vice President, Pabst Brewing Co., Merchandise Mart, Chicago 54, Illinois.

The following members were elected May 24, 1957:

FELLOWS

Baker, Michael H.
President, M. H. Baker Co., 1645 Hennepin Ave., Minneapolis 3, Minn.

Greathouse, Dr. Lucien H.
U. S. Department of Agriculture, 1100 Robert E. Lee Blvd., New Orleans 19, La.

Jonassen, Dr. Hans B.
Professor of Chemistry, Tulane University, New Orleans, La.

Slobodian, Dr. Evelyn S.
Instructor in Research Surgery, New York University, Post-Graduate Medical School, Bellevue Medical Center, New York 16, N. Y.

Soffer, Dr. Herbert
Development Chemist, American Cyanamid Co., Bound Brook, N. J.

Walker, Thomas B.
Research Chemist, Liggett & Myers Tobacco Co, West Main St., Durham, N. C.

MEMBERS

Garnett, Stuart R.
Chemist & Chemical Engineer, Blue Diamond Corp., 1650 S. Alameda, Los Angeles 54, Calif.

Murray, Jerome E.
Turco Products, Inc., 6135 S. Central, Los Angeles, Calif.

Stokes, Charles S., III.
Research Associate, Manager of Laboratories, Temple University, Philadelphia, Pa.

RAISED FROM ASSOCIATE TO MEMBER

Ressler, Paul C. Jr.
Applied Physics Corp., 552 West Colorado, Pasadena 1, Calif.

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A special all-expense European tour has been organized to include attendance at the 12th ACHEMA (Chemical Engineering Congress) in Frankfort, Germany, and the Chemical & Petroleum Technology Exhibition in London, both to be held in June 1958. For brochure, write: U. S. representatives of ACHEMA, the National Chemical Exposition, 86 E. Randolph St., Chicago 1, Ill.

The Pacific Chemical Exposition will be held April 13-17, 1958, in the new civic exhibit hall, San Francisco, Calif. Information may be obtained from Connolly & Leopold, Hotel Sheraton McAlpin, New York 1, N. Y., managers of the exposition.

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For above two positions: Personnel Office, Hearst Magazines, 309 West 56th St., New York 19, N. Y.

Professional Staff. Applicants wanted with doctorate degrees, or equivalent professional experience, and genuine interest in operations analysis. Apply for information to Institute for Defense Analyses, The Pentagon, Washington 25, D. C.

Dr. Tien-Chuan Wang, formerly of the Radiation Laboratory of Columbia University, has been appointed to the Advanced Research Division of Arthur D. Little, Inc., Cambridge 42, Mass.

How-to-do-it Chemical Education

Dr. Clifford F. Rassweiler, F.A.I.C., who received the 1957 chemical Industry Medal of the American Section, Society of Chemical Industry, October 18th, in New York, N. Y., in his acceptance address proposed that universities add a year of graduate study to the chemistry curriculum, to teach the type of thing important for industrial research. Industry faces problems in utilizing effectively the products that chemical science provides, Dr. Rassweiler pointed out, yet our system of education makes no adequate provision for training graduates in the development of uses vitally important to industrial research. "I realize that I am proposing a 'how-to-do-it' or 'how-to-use-it' form of education, but at an extremely high level. . . . It is concerned with applying scientific experimental principles to the solution of practical problems." As an example, he cited the use of synthetic resins in brake blocks for railroad cars to replace cast iron.

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For Your Library

Ideas, Inventions, and Patents

By Robert A. Buckles. John Wiley & Sons, Inc. 1957. 270 *pp.* $5.95.

This easy-to-read book provides answers to questions such as: What should you do when you get an idea for an invention? Are patent attorneys really necessary? How can patents keep you up-to-date on technological progress? How can you assure yourself or your company maximum protection for "intellectual property"? How can you avoid costly mistakes?

Graphic illustrations range from the first U. S. patent, signed by George Washington, Edmund Randolph, and Thomas Jefferson, through the patent on the first atomic reactor, issued to Enrico Fermi in 1955. The book includes a glossary of common patent terms. Scientists, engineers and industrial executives will find this book readable, interesting and instructive.

—Dr. Lloyd Van Doren, F.A.I.C.

Classics of Biology

By August Pi Suner. Translated by Charles M. Stern. Philosophical Library. 337 *pp.* $7.50.

Written by one of the world's foremost biologists, this survey illuminates the high points in the study of biology from Plato to Julian Huxley. Beginning with the theories on matter and energy in life as propounded by Lavoisier, his compatriot Berthelot, and the German, Helmholtz, the readers are introduced to the various scientists of the world who have contributed to the progress of biology. This is an exciting book for the layman; an eminently useful one for teachers of biology, philosophy, and the history of science.

—Dr. Frederick A. Hessel, F.A.I.C.

Documentation in Action

Conference Proceedings, Western Reserve University, Jan. 16-18, 1956. 5 *Parts: I. Present Requirements, Methods & Problems. II. Programs for the Future. III. Discussion. IV. Cooperative Programs. V. Definition of Research Areas. Jesse H. Shera, Allen Kent and James W. Perry, editors. Reinhold Publishing Corp. xv*-471 *pp.* 9"x6". $10.00.

Although it bears a misleading title,

rests on a faulty definition of documentation, and is a nightmare of tortured semanticism, this book has merit. Disclosures of reduction to practice are far too scanty . . . to justify the title. Documentation is defined (p. 20) as giving maximum utility to information; utility is a property of information which documentation cannot influence . . . Language is tortured, even to such patent absurdities as "language engineering."

Any reader emerging from this thorny thicket of tangled verbiage, will have found some restful clearings of lucid thinking, lucidly expressed. They provide much of the book's merit; the remainder stems (though tangled the outgrowth) from earnest efforts to cultivate tremendously significant new areas in an old field.

Typically, calling the glossary a glossary would not do; it is "A System of Documentation Terminology." Similar inflation recurs. Deleting all belaboring of the obvious would notably shrink page numbers and greatly intensify lucidity. Yet, despite its thoughtless artificial language barriers, the book performs a highly important mission for scientists and technologists. Much is told about existing problems, current or probable future plans and devices for harnessing documentation. Perhaps a future book may justifiably bear the present title.

—Dr. Julian F. Smith, F.A.I.C.

The Guided Missile

By Kenneth W. Gatland. Philosophical Library. 292 pp. 6"x9". $4.75.

A detailed description of the development of the guided missile, with fundamental data on fuels, mechanism, principles of operation, accompanied by profuse illustrations and diagrams.

—Dr. John A. Steffens, F.A.I.C.

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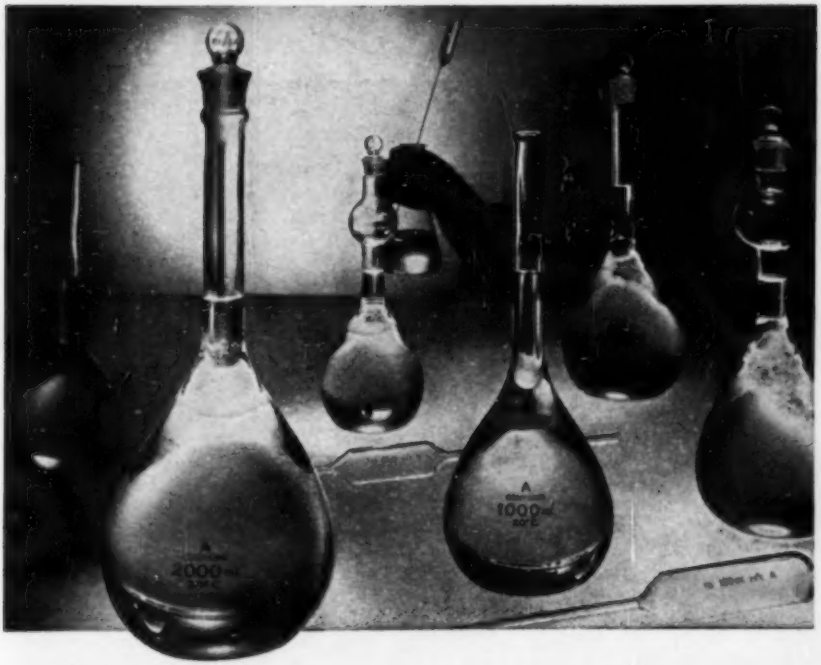
Chemical Books Abroad

By Dr. Rudolph Seiden, F.A.I.C.

Verlag Chemie, Weinheim/Bergstr.: *Chemie und Anwendungen des* 1, 4-*Dioxans,* by W. Stumpf; 1956, 152 pp. (48 ill., 9 tables); paperbound DM 17.80.—A systematic, up-to-date survey of the chemistry of the cyclic ether, dioxane, and its derivatives, their preparation, purification, properties, and uses (1) as solvents in laboratory and industry (e.g., for the extraction of lignin) and (2) in the manufacture of insecticides. With 285 literature references. • *Medizin und Chemie, Vol. V;* 1956, 535 pp.—The volumes I-IV of this work were published by the I. G. Farbenindustrie between 1933 and 1942; Vol. V is published by the Bayer A. G. which belonged to the (now dissolved) I. G. cartel. In this well-illustrated and exceedingly well-printed and bound "Bayer" scientists' report on their research work in the field of chemotherapy of bacterial infections (11 articles) and tropical diseases (4); pharmacology (14); vitamin research (3); cancer research (2); veterinary drugs (2); and insecticides (2). It is amazing to read how West-Germany's industry and science have recovered during the last decade.

Verlag Die Wirtschaft, Berlin W 8: *Die USSR in Zahlen;* 1956, 269 pp.; DM 9.50.—Hundreds of statistical data showing the status of the economy of the USSR in 1955 in comparison with that of prewar and pre-Revolution years. Population and its structure, wages, industry, production, raw materials, agriculture, building industry, transportation, numbers of workers and specialists, commerce, culture (schools, scientific institutions, libraries), health and sanitation are some of the subject matters dealt with in this official document.

Gustav Fischer Verlag, Jena: *Klima und Boden,* by H. Lundegardh; 5th ed., 599 pp. (145 ill., 2 maps); DM 32.—The author, one of the great plant physiologists and biochemists of our times, brought his famous work up to date for those who are interested in the most complex interrelationships which exist between climate and soil and their effects on plant life. Among the ecological factors investigated are light, temperature, water, soil, nutrients, microorganisms, and CO_2.



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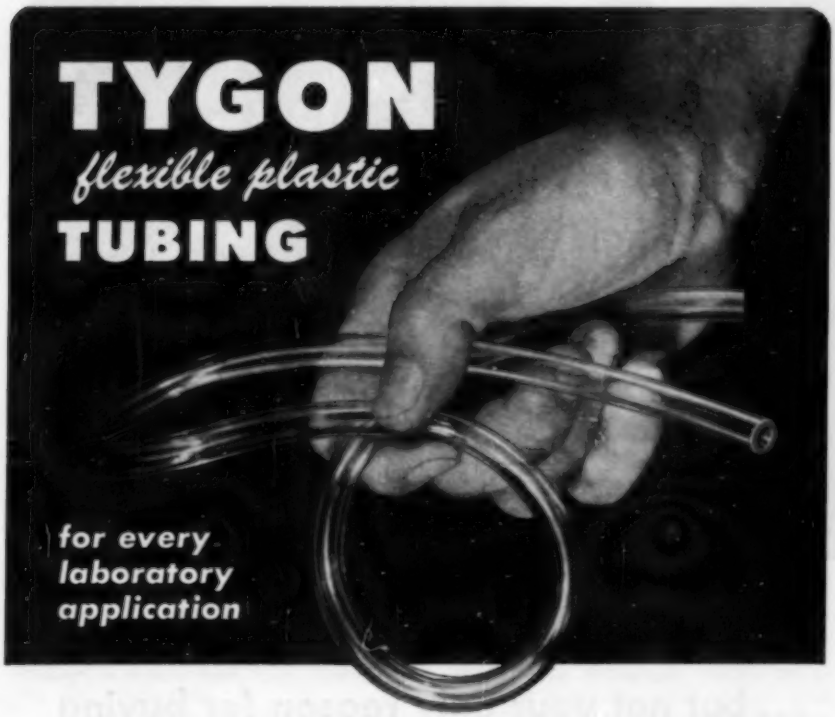

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